



SUCTION DEVICE FOR ATTACHMENT TO A MOTOR-DRIVEN HAND TOOL

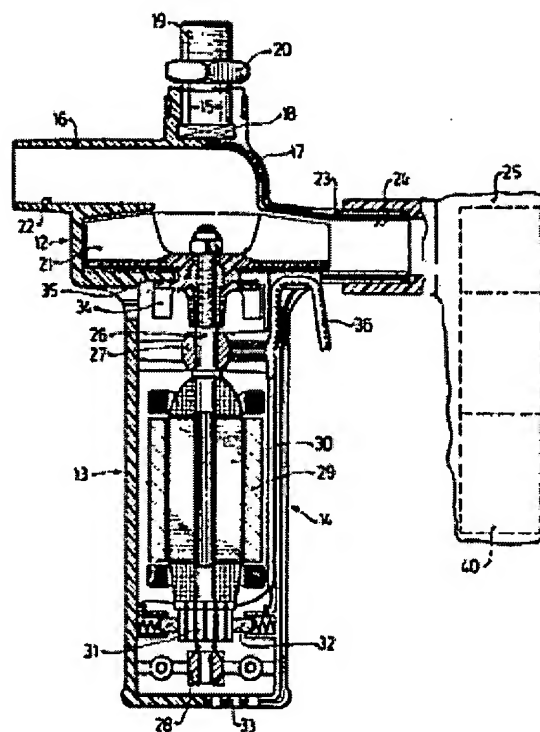
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Abstract of GB1569532

An appliance for extracting drillings knocked off by the tool of a powered hand tool is described which has a collecting device (25) which is connected to a suction line (22, 24) which is run past an extractor fan (12). The appliance is designed as a unit which can be separately attached to the powered hand tool. The extractor fan together with the drive motor (13) is arranged in the interior of an auxiliary handle (14) releasably fastened to the powered hand tool.



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(54) A SUCTION DEVICE FOR ATTACHMENT
 TO A MOTOR-DRIVEN HAND TOOL

- (71) ROBERT BOSCH GMBH., German company of Postfach 50, 7 Stuttgart 1, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:
- The present invention relates to a suction device for attachment to a motor-driven hand tool for the removal of particulate material produced by operation of the tool. The tool may be, for example, a hammer drill and the device then serves to remove the small pieces of material knocked loose by the drill.
- A hand drilling machine is already known on which is attached a suction device for sucking away drillings knocked loose by the drill, which device is designed as a separate unit. This device comprises a suction extractor having a fan wheel driven by way of a friction wheel transmission gear unit which is in engagement with the drill chuck of the machine. This device has the disadvantage that a separate drive motor for the fan wheel is not provided. The drive power for the suction device must thus be applied by the drive motor for the drilling tool itself. In addition, the power transmission from the drill chuck by way of the friction wheel transmission gear unit is subject to very great power losses. The known device thus does not satisfy demands which are made by arduous building site operation.
- An object of the present invention is to provide a suction device for a motor-driven hand tool which does not have these disadvantages.
- In accordance with the invention there is provided a suction device for attachment to a motor-driven hand tool for removing particulate material produced by operation of the tool, the device comprising an auxiliary handle adapted to be detachably connected to the hand tool for steadying it whilst in use, a suction extractor within the handle, a drive motor within the handle for driving the extractor, a suction line opening at one end into the extractor, and a receptacle for receiving the said particulate material connected to the other intake end of the suction line.
- The device in accordance with the invention for sucking away particulate material such as drillings knocked loose by the tool of a hand tool machine has by contrast with the prior art the advantage that an efficient suction extractor having its own drive motor can be used. The drive motor of the suction extractor is disposed in the auxiliary handle which is present in any case. The handiness and utility of the hand tool machine is thus unimpaired.
- The suction device according to the invention may also include further advantageous features as follows. Thus, it is particularly advantageous that the receptacle or catching device is held by a telescopic-like carrying device which can be telescoped against a spring force, is guided parallel to the tool and is secured on the hand tool machine, whereby the suction line is formed by a flexible hose. It has also proved very advantageous that the current feed cable for the electric drive motor of the suction extractor is provided with a plug for connection with an associated socket on the hand tool machine. It is also particularly advantageous that the supply of current to the suction device is controlled by way of the switching means which control the electric drive motor of the hand tool machine itself.
- An embodiment of the invention is hereinafter described, by way of example, with reference to the accompanying drawings, in which:—
- Figure 1 is a side elevational view of a

hammer drill having the suction device of the present invention attached thereto, and Figure 2 is a longitudinal section of the suction device of Figure 1, and including a small modification.

The hammer drill 1 shown in Fig. 1 has at its front end a tool holder or chuck 2 having a tool, here a drill 3, clamped therein. A per se known auxiliary or additional handle 4 is secured on a cylindrical bearing-receiving extension of the housing of the hammer drill 1, in which is located a bearing of a tool spindle which carries the tool holder 2. The additional handle 4 includes clamp-like retaining means 5 which clamps around the aforementioned cylindrical bearing extension of the hammer drill 1, and permits the handle to be angularly adjusted on and removed from the hammer drill and also enables the handle to be secured to the hammer drill. A carrying device 6, which is telescopic against a spring force in a direction parallel to the drill 3, is secured on the retaining means 5 and carries a catching device 7 for the drillings knocked loose by the drill 3. (The carrying device 6 and the catching device 7 are described in more detail in German Offenlegungsschrift 27 05 410). The catching device 7 comprises a cup-shaped catching container 9, held resiliently against the material being drilled, for example a brick wall 8, and having in its base a bore for the drill 3. The catching container 9 carries at its underside a connecting socket 10 to which a suction line designed as a flexible hose 11 is connected. The hose 11 opens by its end remote from the connecting socket 10 into a suction extractor 12.

The suction extractor 12 together with an associated electric drive motor 13 is disposed in the interior of the additional handle 4, more accurately, in the handle grip part 14 of the additional handle. The handle grip part 14 shown in Fig. 2 comprises two plastics material half-shells 16, 17 which are bolted together. The handle grip part 14 carries at its upper end (Fig. 2) a metal securing bolt 15 which carries a square extension 18 at its underside and a thread 19 at its upper side onto which a lock nut 20 is screwed. The thread 19 of the securing bolt 15 is screwed into an associated counter bore in the retaining means 5 (Fig. 1) and secured by means of the lock nut 20.

The suction extractor 12, disposed in the upper region of the handle grip part 14 below the retaining means 5, is constructed as a radial discharge flow extractor. The extractor has an impeller wheel 21 disposed in a chamber into which an intake passage 22, connected to the hose 11, opens in the direction of the wheel axis. The suction extractor 12 has a radial discharge

passage 24 which runs in a connecting socket 23. A collecting device for the drillings transported along with the suction air is seated on the connecting socket 23, connected to the outlet of the suction ventilator 12, and comprises, for example, a dust bag 25. The discharge passage 24 shown in Fig. 2 disposed on an axis parallel to the intake passage 22, can also be disposed displaced by 90°, as shown in Fig. 1 where the dust bag is behind the handle grip part 14.

The extractor wheel 21 is secured on a shaft 26, which is mounted in two shell bearings 27, 28 of the electric drive motor 13. The shell bearings 27, 28 are retained in mounting devices, provided for that purpose, of the plastics material half shells 16, 17. The shaft 26 carries a rotor 30 which rotates in a stator 29 of the drive motor 13 which is constructed as a universal A.C./D.C. motor. The shaft 26 carries at the end facing the shell bearing 28 a commutator 31 against whose outside, brushes 32 which are guided in cup-shaped mounting devices, are pressed resiliently. Inlet slots 33 for the cooling air for the drive motor 13 are disposed on the underside of the substantially tubular handle grip part 14. The air flow to cool the motor is moved through the interior of the handle grip part 14 by means of a fan wheel 34 disposed above the shell bearing 27 on the shaft 26. The cool air flow can rejoin the outer air through outlet slots 35.

The current supply to the electric motor 13 takes place by way of a current feed cable 36 which is connected by way of a plug 37 secured thereon to an associated socket in the housing of the hammer drill 1 (Fig. 1). The socket built into the hammer drill is connected directly to the switch 38 which controls the drive motor of the hammer drill so that when the hammer drill is switched on and off the extractor is also switched on and off simultaneously. The current feed cable 36 can also be secured to the underside of the housing of the hammer drill 1 by clips, in a modification of the representation in Fig. 1 shown by dash lines, or it can alternatively be placed in the dust bag 25.

A dust bag shown in Fig. 1 which is produced from a suitable textile filter material can, in order to increase the stability of its shape, be provided with an inserted plastics material framework 40 which is shown in Fig. 2 by means of dashed lines.

The invention can also be realised just as advantageously by means of embodiments which deviate from the drawings. Thus the suction extractor can be constructed also as a side passage extractor instead of the radial extractor shown. Likewise the drill dust collecting device can also

be connected to the input of the suction extractor. This invention relates to devices for sucking away particulate material such as dust which are constructed as separately mountable units and thus, by means for example, of appropriate adaptors, the suction devices can be used with a variety of electric tools besides the hammer drill described here. Thus the suction device can, for example, be mounted on compass saws and grinders to remove saw and grinding dust.

WHAT WE CLAIM IS:—

1. A suction device for attachment to a motor-driven hand tool for removing particulate material produced by operation of the tool, the device comprising an auxiliary handle adapted to be detachably connected to the hand tool for steadying it whilst in use, a suction extractor within the handle, a drive motor within the handle for driving the extractor, a suction line opening at one end into the extractor, and a receptacle for receiving the said particulate material connected to the other intake end of the suction line.

2. A device in accordance with claim 1, in which the drive motor is seated in the handle grip part of the auxiliary handle.

3. A device in accordance with claim 1 or claim 2, in which the auxiliary handle is secured by means of retaining means which engage in a clamp-like manner about a housing extension of the housing of the hand tool.

4. A device in accordance with claim 3, in which the suction extractor is disposed at that end of the handle connected to the retaining means.

5. A device in accordance with any one of the preceding claims, in which the suction extractor is constructed as a radial extractor.

6. A device in accordance with any one of claims 1 to 4, in which the suction ventilator is constructed as a side passage extractor.

7. A device in accordance with any one of the preceding claims, in which the said

receptacle is supported by a telescope-like carrying device which can be telescoped against a spring force and is secured on the hand tool machine, and the suction line is formed by a flexible hose.

8. A device in accordance with any one of the preceding claims, in which a collecting device for receiving the particulate material sucked into the suction line is connected to the input of the suction extractor.

9. A device in accordance with any one of claims 1 to 7, in which a collecting device for receiving the particulate material sucked into the suction line is connected to the output of the suction extractor.

10. A device in accordance with claim 8 or claim 9, in which the collecting device is formed by a dust bag disposed on the hand tool.

11. A device in accordance with any preceding claim having an electric drive motor with its current feed cable provided with a plug, which plug, in use of the device, is connected with an associated socket on the hand tool.

12. A device in accordance with claim 11, in which the current supply to the feed cable is controlled by way of a switching means which controls the electric drive motor of the hand tool itself.

13. A device according to any preceding claim, in which the suction extractor comprises an impeller wheel disposed within a chamber into which the said one end of the suction line opens.

14. A suction device for attachment to a motor-driven hand tool substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

15. A motor-driven hand tool including a suction device according to any preceding claim.

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Fig.1

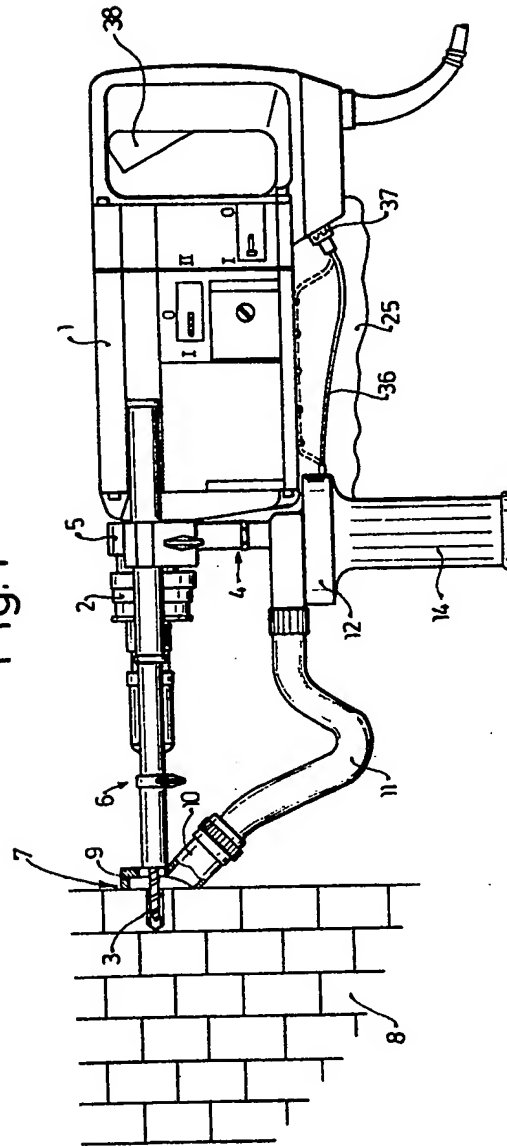


Fig. 2

